SANDAKANIA 3 (1993): 11-16

Two new species of *Scaevola* (*Goodeniaceae*) endemic to Borneo

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Summary. *Scaevola chanii*, endemic to ultramafic areas on Mount Kinabalu in Sabah, and *Scaevola muluensis*, found only on limestone in Sarawak's Mulu National Park, are described. A key to Bornean species of the genus is provided.

The Goodeniaceae are a largely Australian family with comparatively fewer representatives in Malesia. For *Scaevola*, Leenhouts (1957) listed only *S. micrantha* Presl and *S. sericea* Vahl in Borneo, and later (Leenhouts 1964) added a new species *S. verticillata* Leenhouts. *S. sericea* is usually a seashore shrub, sometimes occurring also on sandy substrates slightly inward from the shore, and has a wide distribution from Madagascar, Southeast Asia through Malesia, tropical Australia, Micronesia, Melanesia, to Hawaii. *S. micrantha* is found in Borneo and the Philippine and Talaud Islands, and in Borneo is known only from ultramafic substrates in Sabah in the north. The curious *S. verticillata*, with leaves in whorls in contrast to the spiral leaf arrangement found in the other two species, has been recorded only from the subalpine vegetation on ultramafic soil at 2500 m on Mt Tambuyukon in Sabah; so far it appears to be absent from the nearby Mt Kinabalu.

The two species described in the present paper are endemic to Borneo, with apparently very restricted occurrence. One, *S. chanii*, is known only from the ultramafic area around 2500-3000 m on Mt Kinabalu. The other, *S. muluensis*, has been documented only from the Mt Api limestone in the Mulu National Park in Sarawak's 4th Division. Thus it appears that the genus in Borneo includes a number of species which have adapted and are narrowly restricted to ultramafic and limestone substrates within the largely sedimentary (sandstone) geology of Borneo. It would not be surprising to find further species with such narrow preferences and distributions in Borneo, as the floras of the limestone, metamorphic and volcanic areas, and that of the high mountains, have not been thoroughly explored.

A key to the species of *Scaevola* in Borneo

1a. Leaves in whorls of four ..... *S. verticillata*

1b. Leaves spirally arranged.

2a. Leaves sessile to subsessile, the blades decurrent more or less all the way to the nodes or the stalks exceedingly short and inconspicuous.

3a. Plants of sandy, rocky or cliff sites beside the sea or along the coast. Leaves large, exceeding 10 cm long, with long-decurrent bases. Cymes (2-)3-5(-6)-times branched, often 6-10 cm long. Calyx lobes linear to lanceolate, 2-3 mm long (sometimes elongating to 5-7 mm long); corolla with a fused part 15-20 mm long and free lobes 5-10 mm long. Fruits broad-obovoid to globose, 8-12 mm long, strongly ridged ..... *S. sericea*

3b. Plants of high elevation on mountains (known only on Mt Kinabalu, Sabah). Leaves small, 1-7 cm long, more or less abruptly sessile. Cymes 1-2-times branched, not exceeding 3 cm long. Calyx lobes triangular, less than 1 mm long; corolla with a fused part 4-6 mm long and free lobes 4-6 mm long. Fruits narrow-obovoid, 3.5-5 mm long, slightly ridged .... *S. chanii*, sp. nov.

2b. Leaves distinctly stalked, decurrent basal part of the blades very narrow and inconspicuous.

4a. Plants of ultramafic substrates (in Borneo known only in Sabah). Leaves large, 8-15 cm long, distinctly crenate-dentate on the margins. Cymes 3-6-times branched, 5-9 cm long, the first pair of bracts conspicuously larger and leaf-like, peduncle 2-3.5 cm long. Flowers in the forks of cyme branches stalked .... *S. micrantha*

4b. Plants of limestone (in Sarawak's Mulu National Park). Leaves small, not exceeding 8 cm long, only minutely and inconspicuously crenate on the margins. Cymes 1-2-times branched, not exceeding 2.5 cm long, the first pair of bracts tiny triangular structures, peduncle to 1 cm long only. Flowers in the forks of cyme branches sessile ..... *S. muluensis*, sp. nov.

The new species

Scaevola chanii *Wong*, **sp. nov**. *S. sericeae affinis sed in regionibus montanis crescens, foliis parvis 1-7 cm longis, cymis solum 1-2 X ramificatis longitudine 3 cm non*

excedentibus, lobis calycis triangularibus minus quam 1 mm longis, parte corollae connata 4-6 mm longa differt. Typus: Chan, Jamal & Wong WKM 2360, Sabah, Ranau, Mt Kinabalu, summit trail through ultramafic soil, 2900 m alt. (holotypus SAN; isotypi K, KEP, L, SAR, SNP).

Shrub or treelet, to 2-3 m high. Bark pale grey brown, smooth to lightly fissured. Leaves spirally arranged, obovate, 1-7 cm long, 0.6-3 cm wide, margin purplish and minutely crenate-dentate, coriaceous; glabrous except for small tufts of silvery white hairs in the leaf axils, and tiny silvery round scales all over the young leaves; nerves 4-8 pairs, inconspicuous; stalks very short, only 1-2 mm long at most, inconspicuous. Inflorescences 1.5-2.5 cm long, branched only 1-2 times, peduncle 0.7-2 cm long; first pair of bracts triangular-linear, small; glabrous except for tufts of pale hairs in the bract axils. Flowers sessile; calyx cup obovoid, glabrous, the lobes triangular, less than 1 mm long, pale pilose on the margins; corolla olive green and sparsely pale hairy on the outside, the fused part 4-6 mm long, the free lobes 4-6 mm long, cream and pale pilose inside; stamens with filaments 3 mm long, anthers 0.7-1 mm long; style green, 6-8 mm long; indusium around the stigma orange-brown, with scattered pale hairs on the surface, densely pale hairy on the margin. Fruits obovoid, 3.5-5 mm long, slightly ridged, green ripening black.

The species is illustrated in Figs. 1 and 2.

Fig. 1. Flower of *Scaevola chanii*.

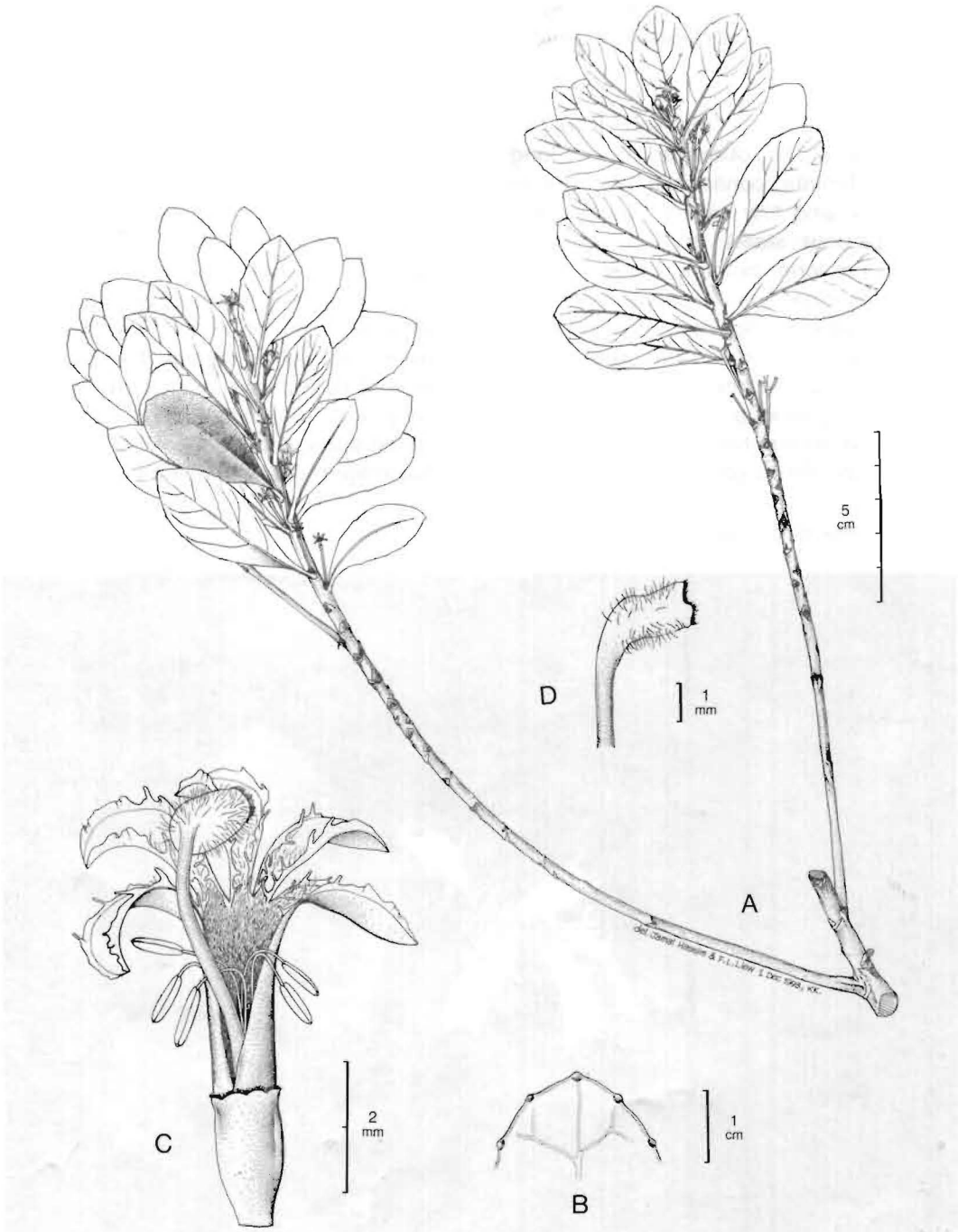

Fig. 2. *Scaevola chanii.* **A.** Flowering leafy branches. **B.** Detail of leaf tip and margin, showing glands. **C.** Flower. **D.** Indusiate stigma at the tip of the style. All from *Chan, Jamal & Wong* WKM 2360.

SPECIMENS EXAMINED - BORNEO. SABAH: Ranau, Mt Kinabalu, summit trail through ultramafic soil, 2900 m alt., *Chan, Jamal & Wong* WKM 2360 (holotype SAN, isotypes K, KEP, L, SAR, SNP), north of Carson's Camp, *Hotta* 389 (SAN), near Carson's Camp, *Lee, Aban & Dewol* SAN 69981 (SAN), 2860 m, *Sato, Jinius & Andau 977* (SAN), about 3000 m, *Watkins* SAN 57946 (SAN).

A species of very restricted occurrence, it can be seen along the usual climbers' trail up Mt Kinabalu, where it is quite noticeable around 2900 m. It appears to flower frequently throughout the year.

Scaevola muluensis *Wong* **sp. nov**. *S. micranthae affinis sed solum in terra calcarea inventa, foliis parvis longitudine 8 cm non excedentibus margine tantum minute crenatis, cymis modo 1-2 X ramificatis longitudine 2.5 cm non excedentibus, pedunculo inflorescentiae ut maximum 1 cm longo, floribus sessilibus in furcis ramulorum cymorum crescentibus differt. Typus: Argent & Jermy RGS Mulu Expedition 1977-78 No. 1011, Sarawak, 4th Division, Gunong Api (holotypus SAN; isotypi E, SAR).*

Shrub to about 1 m high. Leaves spirally arranged, obovate, 4-6.5 cm long, 2-3 cm wide, margin only minutely and inconspicuously crenate, thinly coriaceous; glabrous except for scattered short pale hairs on the stalk and tufts of short pale hairs in the leaf axils; nerves 5-6 pairs, slightly elevated on both surfaces when dry; stalks 5-13 mm long, distinct. Inflorescences 1-2 cm long, branched only 1-2 times, peduncle to 1 cm long only; first pair of bracts tiny triangular structures; glabrous except for scanty pale hairs in the bract axils. Flowers sessile; calyx cup obovoid, glabrous, the lobes triangular, about 0.5 mm long, glabrous to sparsely short-hairy on the margins; corolla sparsely pale hairy on the outside, the fused part 6-6.5 mm long, the free lobes 4.5-5 mm long, pale pilose inside; stamens with filaments 4 mm long, anthers about 1 mm long; style 6-6.5 mm long; indusium around the stigma with pale long hairs all over, densely pale hairy on the margin. Fruits obovoid, 4-5 mm long, slightly ridged, ripening black.

The species is illustrated in Fig. 3.

SPECIMENS EXAMINED - BORNEO. SARAWAK: 4th Division, Gunong Mulu National Park, Gunong Api, 1000 m alt., *Anderson* S.30907 (SAR), 1600 m alt., *Argent & Jermy* RGS Mulu Expedition 1977-78, no. 1011 (holotype SAN, isotypes E, SAR).

This species is probably restricted to limestone, but there are as yet no collections from other limestone areas in Sarawak or Sabah. The glabrous calyx lobes and more cup-shaped indusium at the tip of the style are additional characters distinguishing this species from *S. chanii*, which has leaves and flowers that are similar in size.

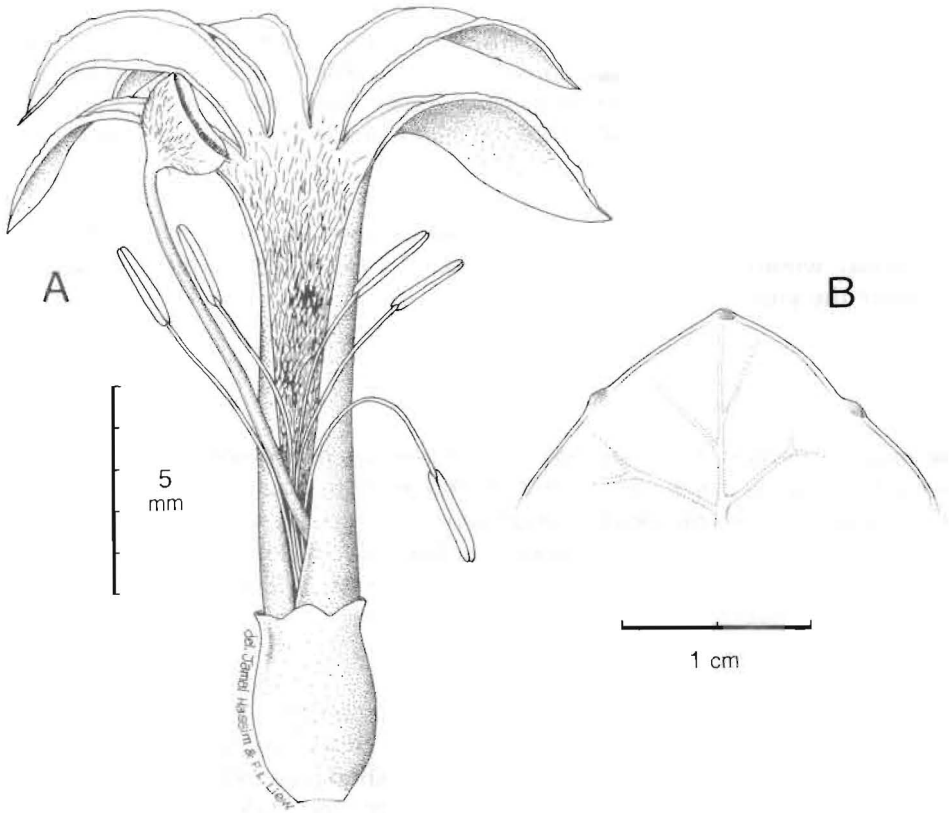

Fig. 3. *Scaevola muluensis.* **A.** Flower. **B.** Detail of leaf tip and margin, showing glands. All from Argent & Jermy RGS Mulu Expedition 1977-78 No. 1011.

ACKNOWLEDGEMENTS

I am grateful to the Curator of the Herbarium, Sarawak Forestry Department, for the opportunity to study specimens there. Mark Coode of the Herbarium, Royal Botanic Gardens, Kew, kindly provided the Latin translation to the diagnoses presented here. I thank Jamili Nais of the Sabah Parks (herbarium acronym SNP used here) for making it possible to collect specimens from Mt Kinabalu. The drawings in Figs. 2 and 3 are the work of Jamal Hassim and Lucy F.L. Liew.

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